

# Getting to Know Our “App People”

Large data from chess hints what to expect and how to prosper

Kenneth W. Regan<sup>1</sup>

University at Buffalo (SUNY)

TEDxBuffalo, 14 October, 2014

---

<sup>1</sup>Includes joint work with Guy Haworth Giuseppe DiFatta, Bartłomiej Macieja, Tamal Biswas, and Jason Zhou. Websites: <http://www.cse.buffalo.edu/~regan/> <http://www.cse.buffalo.edu/~regan/chess/fidelity/>

# Intelligent Personal Assistants

- Software Agents, many with Personas...

## Intelligent Personal Assistants

- Software Agents, many with Personas...
- GPS voices, Apple Siri, IBM Watson, Google Now...

# Intelligent Personal Assistants

- Software Agents, many with Personas...
- GPS voices, Apple Siri, IBM Watson, Google Now...
- SILVIA: "Intelligence on Command"

## Intelligent Personal Assistants

- Software Agents, many with Personas...
- GPS voices, Apple Siri, IBM Watson, Google Now...
- SILVIA: "Intelligence on Command"
- Legion in Online Gaming...

## Intelligent Personal Assistants

- Software Agents, many with Personas...
- GPS voices, Apple Siri, IBM Watson, Google Now...
- SILVIA: "Intelligence on Command"
- Legion in Online Gaming...Microsoft Cortana came from *Halo*.

## Intelligent Personal Assistants

- Software Agents, many with Personas...
- GPS voices, Apple Siri, IBM Watson, Google Now...
- SILVIA: "Intelligence on Command"
- Legion in Online Gaming...Microsoft Cortana came from *Halo*.



**SILVIA**  
Intelligence On Command



# Cognitive Agents

- **Read** large amounts of data

## Cognitive Agents

- **Read** large amounts of data
- **Evaluate** options

## Cognitive Agents

- **Read** large amounts of data
- **Evaluate** options
- **Write** recommendations

## Cognitive Agents

- Read large amounts of data
- Evaluate options
- Write recommendations
- Guide our Decision Making

## Cognitive Agents

- Read large amounts of data
- Evaluate options
- Write recommendations
- Guide our Decision Making

priceline

**NEGOTIATOR**

"I've got the skills to shrink your travel bills."

# Autonomy, Folly, and Partnership?

- We may empower agents to take actions for us...

# Autonomy, Folly, and Partnership?

- We may empower agents to take actions for us...
- ...drive a harder bargain than we would...

## Autonomy, Folly, and Partnership?

- We may empower agents to take actions for us...
- ...drive a harder bargain than we would...
- ...even **walk away** when we might not.

## Autonomy, Folly, and Partnership?

- We may empower agents to take actions for us...
- ...drive a harder bargain than we would...
- ...even **walk away** when we might not.
- Automated Trading

# Autonomy, Folly, and Partnership?

- We may empower agents to take actions for us...
- ...drive a harder bargain than we would...
- ...even **walk away** when we might not.
- Automated Trading
- Folly of Over-Reliance:

# Autonomy, Folly, and Partnership?

- We may empower agents to take actions for us...
- ...drive a harder bargain than we would...
- ...even **walk away** when we might not.
- Automated Trading
- Folly of Over-Reliance: Flash Crash,

# Autonomy, Folly, and Partnership?

- We may empower agents to take actions for us...
- ...drive a harder bargain than we would...
- ...even **walk away** when we might not.
- Automated Trading
- Folly of Over-Reliance: Flash Crash, Flash Floods

## Autonomy, Folly, and Partnership?

- We may empower agents to take actions for us...
- ...drive a harder bargain than we would...
- ...even **walk away** when we might not.
- Automated Trading
- Folly of Over-Reliance: Flash Crash, Flash Floods



## Autonomy, Folly, and Partnership?

- We may empower agents to take actions for us...
- ...drive a harder bargain than we would...
- ...even **walk away** when we might not.
- Automated Trading
- Folly of Over-Reliance: Flash Crash, Flash Floods



Photo actually comes from story on using GPS to warn of disasters.



## What Can We Tell...?

- Agents are not supposed to be “Precisely Our Cup of Tea.”

## What Can We Tell...?

- Agents are not supposed to be “Precisely Our Cup of Tea.”
- Do they have definite *Cognitive Traits*?

## What Can We Tell...?

- Agents are not supposed to be “Precisely Our Cup of Tea.”
- Do they have definite *Cognitive Traits*?
- Results I will talk about from my research suggest Yes.

## What Can We Tell...?

- Agents are not supposed to be “Precisely Our Cup of Tea.”
- Do they have definite *Cognitive Traits*?
- Results I will talk about from my research suggest Yes.
- Can we tell a computer agent from a human actor?

## What Can We Tell...?

- Agents are not supposed to be “Precisely Our Cup of Tea.”
- Do they have definite *Cognitive Traits*?
- Results I will talk about from my research suggest Yes.
- Can we tell a computer agent from a human actor?
- = the classic **Turing Test** in AI.

## What Can We Tell...?

- Agents are not supposed to be “Precisely Our Cup of Tea.”
- Do they have definite *Cognitive Traits*?
- Results I will talk about from my research suggest Yes.
- Can we tell a computer agent from a human actor?
- = the classic **Turing Test** in AI.
- Turing Test: computer agent trying to pass as human.

## What Can We Tell...?

- Agents are not supposed to be “Precisely Our Cup of Tea.”
- Do they have definite *Cognitive Traits*?
- Results I will talk about from my research suggest Yes.
- Can we tell a computer agent from a human actor?
- = the classic **Turing Test** in AI.
- Turing Test: computer agent trying to pass as human.
- The reverse: human making illicit use of computer agent.

## What Can We Tell...?

- Agents are not supposed to be “Precisely Our Cup of Tea.”
- Do they have definite *Cognitive Traits*?
- Results I will talk about from my research suggest Yes.
- Can we tell a computer agent from a human actor?
- = the classic **Turing Test** in AI.
- Turing Test: computer agent trying to pass as human.
- The reverse: human making illicit use of computer agent.
- Fraud Detection—

## What Can We Tell...?

- Agents are not supposed to be “Precisely Our Cup of Tea.”
- Do they have definite *Cognitive Traits*?
- Results I will talk about from my research suggest Yes.
- Can we tell a computer agent from a human actor?
- = the classic **Turing Test** in AI.
- Turing Test: computer agent trying to pass as human.
- The reverse: human making illicit use of computer agent.
- Fraud Detection—Cheating in Games—

## What Can We Tell...?

- Agents are not supposed to be “Precisely Our Cup of Tea.”
- Do they have definite *Cognitive Traits*?
- Results I will talk about from my research suggest Yes.
- Can we tell a computer agent from a human actor?
- = the classic **Turing Test** in AI.
- Turing Test: computer agent trying to pass as human.
- The reverse: human making illicit use of computer agent.
- Fraud Detection—Cheating in Games—Online too?

## What Can We Tell...?

- Agents are not supposed to be “Precisely Our Cup of Tea.”
- Do they have definite *Cognitive Traits*?
- Results I will talk about from my research suggest Yes.
- Can we tell a computer agent from a human actor?
- = the classic **Turing Test** in AI.
- Turing Test: computer agent trying to pass as human.
- The reverse: human making illicit use of computer agent.
- Fraud Detection—Cheating in Games—Online too?
- That's where I came in, 8 years ago...

## What Can We Tell...?

- Agents are not supposed to be “Precisely Our Cup of Tea.”
- Do they have definite *Cognitive Traits*?
- Results I will talk about from my research suggest Yes.
- Can we tell a computer agent from a human actor?
- = the classic **Turing Test** in AI.
- Turing Test: computer agent trying to pass as human.
- The reverse: human making illicit use of computer agent.
- Fraud Detection—Cheating in Games—Online too?
- That's where I came in, 8 years ago...has led to much more besides.

# Cheating With Computers at Chess

- Would have been laughed at in 1970s.

## Cheating With Computers at Chess

- Would have been laughed at in 1970s.
- Not in 1980s: **Belle**, **Hitech**, **Deep Thought** achieved US rank of Master.

## Cheating With Computers at Chess

- Would have been laughed at in 1970s.
- Not in 1980s: **Belle**, **Hitech**, **Deep Thought** achieved US rank of Master.
- 1990s: **Deep Blue** defeated world champ Kasparov.

## Cheating With Computers at Chess

- Would have been laughed at in 1970s.
- Not in 1980s: **Belle**, **Hitech**, **Deep Thought** achieved US rank of Master.
- 1990s: **Deep Blue** defeated world champ Kasparov.
- 2000s: World champ Kramnik lost to a home PC.

## Cheating With Computers at Chess

- Would have been laughed at in 1970s.
- Not in 1980s: **Belle**, **Hitech**, **Deep Thought** achieved US rank of Master.
- 1990s: **Deep Blue** defeated world champ Kasparov.
- 2000s: World champ Kramnik lost to a home PC.
  - Your laptop could have beaten him too...

## Cheating With Computers at Chess

- Would have been laughed at in 1970s.
- Not in 1980s: **Belle**, **Hitech**, **Deep Thought** achieved US rank of Master.
- 1990s: **Deep Blue** defeated world champ Kasparov.
- 2000s: World champ Kramnik lost to a home PC.
  - Your laptop could have beaten him too...
- 2010s: Your I-Pad, your smartphone, even Siri...

## Cheating With Computers at Chess

- Would have been laughed at in 1970s.
- Not in 1980s: **Belle**, **Hitech**, **Deep Thought** achieved US rank of Master.
- 1990s: **Deep Blue** defeated world champ Kasparov.
- 2000s: World champ Kramnik lost to a home PC.
  - Your laptop could have beaten him too...
- 2010s: Your I-Pad, your smartphone, even Siri...
  - You've heard the one about an I-Pad being more powerful than a supercomputer 20 years ago?

## Cheating With Computers at Chess

- Would have been laughed at in 1970s.
- Not in 1980s: **Belle**, **Hitech**, **Deep Thought** achieved US rank of Master.
- 1990s: **Deep Blue** defeated world champ Kasparov.
- 2000s: World champ Kramnik lost to a home PC.
  - Your laptop could have beaten him too...
- 2010s: Your I-Pad, your smartphone, even Siri...
  - You've heard the one about an I-Pad being more powerful than a supercomputer 20 years ago?
- Last Month: Apple iWatch, Google Glass...

## Cheating With Computers at Chess

- Would have been laughed at in 1970s.
- Not in 1980s: **Belle**, **Hitech**, **Deep Thought** achieved US rank of Master.
- 1990s: **Deep Blue** defeated world champ Kasparov.
- 2000s: World champ Kramnik lost to a home PC.
  - Your laptop could have beaten him too...
- 2010s: Your I-Pad, your smartphone, even Siri...
  - You've heard the one about an I-Pad being more powerful than a supercomputer 20 years ago?
- Last Month: Apple iWatch, Google Glass...**Cognitive Implants??**

## Cheating With Computers at Chess

- Would have been laughed at in 1970s.
- Not in 1980s: **Belle**, **Hitech**, **Deep Thought** achieved US rank of Master.
- 1990s: **Deep Blue** defeated world champ Kasparov.
- 2000s: World champ Kramnik lost to a home PC.
  - Your laptop could have beaten him too...
- 2010s: Your I-Pad, your smartphone, even Siri...
  - You've heard the one about an I-Pad being more powerful than a supercomputer 20 years ago?
- Last Month: Apple iWatch, Google Glass...**Cognitive Implants??**
- **A Big Problem**

## Cheating With Computers at Chess

- Would have been laughed at in 1970s.
- Not in 1980s: **Belle**, **Hitech**, **Deep Thought** achieved US rank of Master.
- 1990s: **Deep Blue** defeated world champ Kasparov.
- 2000s: World champ Kramnik lost to a home PC.
  - Your laptop could have beaten him too...
- 2010s: Your I-Pad, your smartphone, even Siri...
  - You've heard the one about an I-Pad being more powerful than a supercomputer 20 years ago?
- Last Month: Apple iWatch, Google Glass... **Cognitive Implants??**
- **A Big Problem**
- I have been involved in some confessed or proven cases...

## Cheating With Computers at Chess

- Would have been laughed at in 1970s.
- Not in 1980s: **Belle**, **Hitech**, **Deep Thought** achieved US rank of Master.
- 1990s: **Deep Blue** defeated world champ Kasparov.
- 2000s: World champ Kramnik lost to a home PC.
  - Your laptop could have beaten him too...
- 2010s: Your I-Pad, your smartphone, even Siri...
  - You've heard the one about an I-Pad being more powerful than a supercomputer 20 years ago?
- Last Month: Apple iWatch, Google Glass...**Cognitive Implants??**
- **A Big Problem**
- I have been involved in some confessed or proven cases...
- ...and many more where my “Fidelity” model turns aside unfounded accusations.

## [Outline for Main Body of Talk]

Results from my research:

- ➊ Besides Skill, computers have markedly different Style.

## [Outline for Main Body of Talk]

Results from my research:

- ➊ Besides Skill, computers have markedly different Style.
- ➋ Make fewer big mistakes—almost goes without saying.

## [Outline for Main Body of Talk]

Results from my research:

- ① Besides Skill, computers have markedly different Style.
- ② Make fewer big mistakes—almost goes without saying.
- ③ Play more Wait-and-See: “Spock Versus Kirk”

## [Outline for Main Body of Talk]

Results from my research:

- ① Besides **Skill**, computers have markedly different **Style**.
- ② Make fewer big mistakes—almost goes without saying.
- ③ Play more Wait-and-See: “**Spock Versus Kirk**” (show charts)

## [Outline for Main Body of Talk]

Results from my research:

- ① Besides **Skill**, computers have markedly different **Style**.
- ② Make fewer big mistakes—almost goes without saying.
- ③ Play more Wait-and-See: “**Spock Versus Kirk**” (show charts)
- ④ Pick up every little difference: “**Forest And Trees**”

## [Outline for Main Body of Talk]

Results from my research:

- ① Besides **Skill**, computers have markedly different **Style**.
- ② Make fewer big mistakes—almost goes without saying.
- ③ Play more Wait-and-See: “**Spock Versus Kirk**” (show charts)
- ④ Pick up every little difference: “**Forest And Trees**” (show charts)

## [Outline for Main Body of Talk]

Results from my research:

- ➊ Besides Skill, computers have markedly different Style.
- ➋ Make fewer big mistakes—almost goes without saying.
- ➌ Play more Wait-and-See: “Spock Versus Kirk” (show charts)
- ➍ Pick up every little difference: “Forest And Trees” (show charts)
- ➎ Avoid Fluster.

## [Outline for Main Body of Talk]

Results from my research:

- ➊ Besides **Skill**, computers have markedly different **Style**.
- ➋ Make fewer big mistakes—almost goes without saying.
- ➌ Play more Wait-and-See: “**Spock Versus Kirk**” (show charts)
- ➍ Pick up every little difference: “**Forest And Trees**” (show charts)
- ➎ **Avoid Fluster**. (show charts)

## [Outline for Main Body of Talk]

Results from my research:

- ➊ Besides **Skill**, computers have markedly different **Style**.
- ➋ Make fewer big mistakes—almost goes without saying.
- ➌ Play more Wait-and-See: “**Spock Versus Kirk**” (show charts)
- ➍ Pick up every little difference: “**Forest And Trees**” (show charts)
- ➎ **Avoid Fluster**. (show charts)
- ➏ Programmed to **Avoid Risks**.

## [Outline for Main Body of Talk]

Results from my research:

- ➊ Besides Skill, computers have markedly different Style.
- ➋ Make fewer big mistakes—almost goes without saying.
- ➌ Play more Wait-and-See: “Spock Versus Kirk” (show charts)
- ➍ Pick up every little difference: “Forest *And* Trees” (show charts)
- ➎ Avoid Fluster. (show charts)
- ➏ Programmed to Avoid Risks.
- ➐ Dispassionate?

## [Outline for Main Body of Talk]

Results from my research:

- ➊ Besides **Skill**, computers have markedly different **Style**.
- ➋ Make fewer big mistakes—almost goes without saying.
- ➌ Play more Wait-and-See: “**Spock Versus Kirk**” (show charts)
- ➍ Pick up every little difference: “**Forest And Trees**” (show charts)
- ➎ **Avoid Fluster**. (show charts)
- ➏ Programmed to **Avoid Risks**.
- ➐ **Dispassionate**? GPS “Recalculating...” said with a sigh?

# What Can We Learn?

- ① Avoid overconfidence of “wanting to move first.”

# What Can We Learn?

- ① Avoid overconfidence of “wanting to move first.”
  - (Analogy: NFL teams more often “defer.”)

# What Can We Learn?

- ① Avoid overconfidence of “wanting to move first.”
  - (Analogy: NFL teams more often “defer.”)
- ② Look before we Leap.

# What Can We Learn?

- ① Avoid overconfidence of “wanting to move first.”
  - (Analogy: NFL teams more often “defer.”)
- ② Look before we Leap.
- ③ Don’t rush in...

# What Can We Learn?

- ① Avoid overconfidence of “wanting to move first.”
  - (Analogy: NFL teams more often “defer.”)
- ② Look before we Leap.
- ③ Don’t rush in...
- ④ Evaluate differences in proportion to what’s already determined and what’s at stake.

## What Can We Learn?

- ① Avoid overconfidence of “wanting to move first.”
  - (Analogy: NFL teams more often “defer.”)
- ② Look before we Leap.
- ③ Don’t rush in...
- ④ Evaluate differences in proportion to what’s already determined and what’s at stake.
- ⑤ Take measured risks.

# What Can We Learn?

- ① Avoid overconfidence of “wanting to move first.”
  - (Analogy: NFL teams more often “defer.”)
- ② Look before we Leap.
- ③ Don’t rush in...
- ④ Evaluate differences in proportion to what’s already determined and what’s at stake.
- ⑤ Take measured risks.
- ⑥ Don’t get down...

# What Can We Learn?

- ① Avoid overconfidence of “wanting to move first.”
  - (Analogy: NFL teams more often “defer.”)
- ② Look before we Leap.
- ③ Don’t rush in...
- ④ Evaluate differences in proportion to what’s already determined and what’s at stake.
- ⑤ Take measured risks.
- ⑥ Don’t get down... or rather maybe switch to PDA when we’re down...

# Do We Still Matter?

# Do We Still Matter?

- ➊ Even at a purely calculational pursuit like chess, *we still contribute.*

# Do We Still Matter?

- ➊ Even at a purely calculational pursuit like chess, *we still contribute*.
- ➋ (show results from MPREF-14 paper, book *Average Is Over*)

# Do We Still Matter?

- ➊ Even at a purely calculational pursuit like chess, *we still contribute*.
- ➋ (show results from MPREF-14 paper, book *Average Is Over*)
- ➌ Precisely because they're not precisely our cup of tea...

# Do We Still Matter?

- ➊ Even at a purely calculational pursuit like chess, *we still contribute.*
- ➋ (show results from MPREF-14 paper, book *Average Is Over*)
- ➌ Precisely because they're not precisely our cup of tea...
- ➍ This could be the beginning of a beautiful relationship...